

Applicant: Takao Tsuruoka
Application No.: IPO-P1754

REMARKS/ARGUMENTS

The present application contains claims 1-42. Claims 1, 15-17, 24, 28, 30 and 31 have been amended. Claims 33-42 have been newly added. Claims 2-14, 18, 20, 26, 27, 29 and 32 have been withdrawn from consideration as being directed to a non-elected invention. It is understood that, upon the allowance of a generic claim, applicant will be entitled to consideration of claims for additional species which depend from or otherwise require all of the limitations of an allowable generic claim, as provided for by 37 C.F.R. §1.141.

The title has been amended to comply with the examiner's requirement.

Responsive to the Office Action dated July 6, 2007, the entire text of withdrawn claims 2-14, 18, 20, 26, 27, 29 and 32 have been provided as part of the present amendment and it is submitted that this supplemental amendment is now fully in compliance with 37 CFR 1.121.

The rejection of claims 17 and 28 under 35 U.S.C. Section 112, first paragraph, is respectfully traversed.

Claims 17 and 28 have been amended in the manner proposed by the examiner and it is submitted that they now comply with the requirements of Section 112, first paragraph.

The rejection of claims 28, 30 and 31 under 35 U.S.C. Section 101 is respectfully traversed.

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Claims 28, 30 and 31 have been amended and it is submitted that they now comply with the requirements of Section 101.

The rejection of claims 1, 15 and 16 as anticipated by Prentice et al. ('785) under 35 U.S.C. Section 102(e) is respectfully traversed.

Regarding claim 1, the Examiner states that Pat '785 discloses an image pickup system, shown in Fig. 1 and comprising: noise estimating means 18 for estimating the amount of noise contained in digitized-signals (which are digitized by A/D converter 14) from an image pickup element 10 in which a plurality of pixels 12 are arranged, for each specified unit area comprising a plurality of pixels (i.e. pixel array 10); and noise reducing means for reducing the noise contained in the signals on the basis of the amount of noise estimated by the noise estimating means, the Examiner referring to the subtracting unit 16 which generates the "DARK CORRECTED IMAGE SIGNAL ."

It should be noted that Pat '785 is limited to a technique wherein an **entire frame** is sampled at 20 shown in Fig. 1, and a count of the number of pixels whose values are less than a given threshold which represents dark scene content is determined, and, if the number of such pixel values is less than a predetermined percentage i.e., in one example, is less than 0.03% of the total number of pixels in the image, a dark level correction value of plus 1 (+1) is generated. On the other hand, if the number of pixels which is less than the predetermined threshold is greater than 1.0% of the total number of pixels in the image, a dark level correction value adjustment of minus 1 (-1) is generated.

There is neither teaching nor remote suggestion of reducing dark current based upon detection of conditions which are independent of the pixels which make up the image, Pat '785 being limited to requiring the use of all the pixels which

make up the image.

To the contrary, the present invention detects and utilizes one or more conditions which are **independent** of pixels that make up the image in order to estimate the amount of noise contained in digitized-signals from an image pickup element. More specifically, any one or more of the following conditions which are detected independently of the pixels of the image are used to estimate the amount of noise present in the pixels making up the image: (1) an estimation of temperature is based on determination of the amount of dark current present in an OB (Optical Black) region of the image pickup unit which is independent of the image region, and can best be seen in Figs. 3A and 3B of the present application; and (2) the dark current variance detected from the OB region is used as a basis for determining temperature of the image pickup element. It should be noted that Pat '785 clearly teaches away from such a technique, specifically stating that the invention of '785 "does not use light shielded pixels or any other external reference signal" (see column 2 lines 43-44 of Pat '785).

Clearly, since Pat '785 specifically excludes any external reference signal as well as light shielded pixels to determine and correct a dark current condition, Pat '785 clearly fails to teach noise estimating means which utilizes one or more of a gain or shutter speed which are clearly values external to and independent of the pixels making up the image.

Nevertheless, claim 1 has been amended to more clearly patentably distinguish over Pat '785. Claims 15 and 16 depend from claim 1 and likewise patentably distinguish over '785 for the reasons set forth above regarding claim 1. In addition, regarding claim 16, it should be noted that '785 uniformly applies the dark current correction value to the image based upon the aforesaid upper or lower limit.

In contrast, the present invention performs processing based upon the upper limit of the amount of estimated noise for each pixel unit or unit area, which makes it possible to suppress excessive correct. For example, if the entire image is processed according to '785 and certain portions end up with an excessive correction, the resulting image '785 lacks the quality of the resulting image using the teachings of the present invention.

The rejection of claims 19, 22 and 23 as obvious in view of Prentice et al. ('785) under 35 U.S.C. Section 103(a) is respectfully traversed.

The examiner states that Pat '785 discloses the use of a control system for calculating parameters, making reference to column 3, lines 28-41 and takes Official Notice that arranging a plurality of pixels in a nearby region for interpolation, resolution, reduction and defective pixel correction, is well known in the art. Even assuming, for the sake of argument, that arranging a plurality of pixel values in a nearby region is well known in the art, Pat '785 does **not** teach calculating parameters but merely teaches determining a dark current component. The parameters calculated according to claim 19 are the parameters (i.e., coefficients) A-D recited at lines 15-20 on page 22 of the specification of the present application. The parameter calculating means of claim 22 comprises gain calculating means and the calculating means of claim 23 comprises shutter speed calculating means. As was set forth above, Patent '785 specifically **avoids** and **eliminates** the need for detecting conditions independent of the pixels making up an image frame, whereas the present invention utilizes these values, which are independent of the pixels making up the image frame, for the parameter calculated means.

For these reasons, it is submitted that claims 19, 22 and 23 patentably distinguish over '785.

It is noted that claims 17, 21, 24 and 25 will be allowed upon being rewritten to include all of the limitations of their base claim and any intervening claims. It is submitted that, since the claims from which the allowable claims depend are allowable over the cited prior art for the reasons cited above, there is no need to amend the allowable claims.

It is noted that claim 17 has been indicated as being allowable and, since claim 17 has been amended to comply with Section 112, it is submitted that claim 17 should be allowed. It is noted that claims 17, 28, 30 and 31 are free of any prior art rejection and, since these claims now comply with Section 101, they should be allowed.

In view of the foregoing, reconsideration and allowance of claims 1, 15-17, 19, 22, 23, 28, 30 and 31, together with allowable claims 21, 24 and 25 (as well as claim 17 which has been amended to comply with Section 112), are earnestly solicited. New claims 33-42 are respectively based on original claims 1, 15-17, 19 and 21-25, in which the "means-plus-function" language has been replaced by structure and it is submitted that new claims 33-42 patentably distinguish over the cited prior art for the reasons set forth above regarding their corresponding original claims, further noting that claims 36, 38, 41 and 42 respectively correspond to allowable claims 17, 21, 24, and 25.

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Conclusion

If the Examiner believes that any additional minor formal matters need to be addressed in order to place this application in condition for allowance, or that a telephone interview will help to materially advance the prosecution of this application, the Examiner is invited to contact the undersigned by telephone at the Examiner's convenience.

In view of the foregoing remarks, Applicants respectfully submit that the present application, including original claims 1, 15-17, 19, 21-25, 28, 30 and 31 and new claims 33-42, is in condition for allowance and a notice to that effect is respectfully requested.

Respectfully submitted,

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